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Renewable Resource Notes

The Southern Pine Beetle

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The Southern Pine Beetle (SPB) inhabits Tennessee forests, and as forest landowners, we should be prepared to deal with the insect. Each year SPB causes thousands of dollars worth of damage to stands of Southern yellow pines, e.g., Loblolly, shortleaf and Virginia pines. Landowners living near or on their property can reduce losses to SPB by knowing the symptoms of a SPB attack, what to do about it and how to prevent it.

Symptoms of a SPB Attack

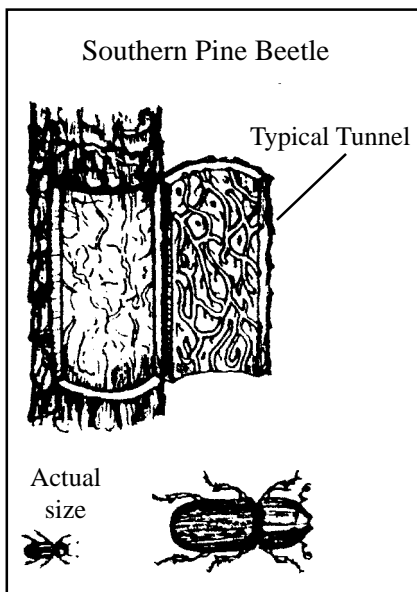


Figure 1

Areas of dead or dying pines with yellow or red needles are obvious indicators that something is wrong. These trees are easily spotted from the air and, with more difficulty, from the ground. Ground checking, however, is necessary before accusing SPB. Pitch tubes, exit holes and S-shaped galleries must be examined before confirming death by SPB.

Pitch tubes are masses of resin that accumulate where the adult SPBs bore into a pine. Pitch tubes look like popcorn or gum stuck in the tree's bark crevices. On freshly attacked trees, pitch tubes are soft and white or light pink and sticky to the touch. If you don't notice pitch tubes at eye level, look higher. SPBs usually attack at heights greater than 10 feet.

Pitch tubes are a defense mechanism for pines. The trees literally try to "pitch" attacking beetles out of their inner bark. Resisting a SPB attack depends on a strong pitch flow. In severely stressed trees, pitch tubes may not form as SPB enters. Reddish boring dust in bark crevices, spider webs and around the base of the tree is the only indicator of a fresh SPB attack on a weak tree.

Another symptom of a SPB attack is exit holes left in a tree's bark when an adult beetle emerges. Freshly attacked trees do not have these pencil-puncture-like holes; the attacking beetles are busy feeding and laying eggs. Within a few days of a mass attack, however, these beetles will emerge from

the tree, leaving a few exit holes. In two to six weeks, depending on the weather, numerous exit holes will cover the tree as the developed brood of SPBs emerge.

The SPB lays eggs, develops and feeds between the wood and the bark of pines. When adult beetles enter the tree, they construct tunnels or galleries in a distinctive S-shaped pattern. Tunneling in the inner bark effectively girdles the pine tree, killing it and loosening the bark. On freshly attacked trees, the bark remains tight. However, as more beetles lay eggs and the larvae develop, the bark eventually slips easily from the tree. Removing a piece of bark and finding S-shaped tunnels is positive evidence of a SPB attack.

During the summer, a SPB outbreak can spread rapidly. The attack, however, does follow a predictable sequence between May and October. Table 1 summarizes the symptoms associated with various stages of SPB-attacked trees.

Table 1. Symptoms Associated with Various Stages of SPB-Attacked Trees

Tree Stage	Symptom			
	Foliage	Pitch Tubes	Bark	Exit Holes
<i>Freshly infested</i>	Green	Soft, white, light pink	Tight, hard to remove	None
<i>Infested with developing brood</i>	Green trees with larvae; fade to yellow before brood emerges	White, hardened	Loose: peels easily	Few, associated with attacking adult emergence
<i>Vacated, dead tree</i>	Red, needles falling	Hard, yellow, crumbles easily	Very loose, easily removed	Numerous

What to do with a SPB spot

When you are sure you have SPB, consider some kind of action. To set a control priority for a SPB spot, begin by walking completely around the spot, and locating freshly infested trees. Groups of freshly infested trees are called “active heads” and are a source of pheromone, attracting more beetles. Active heads also indicate the direction(s) in which the spot is growing.

Next, counting the number of freshly infested trees as well as “yellow tops” of freshly attacked trees is most important. These trees are sources of pheromones or chemical attractants produced by adult SPBs when they bore into a tree. Using pheromones, “pioneer” beetles call in enough help to kill the invaded pine. Extra beetles spread to nearby trees and call in still more SPBs.

About 20 feet in front of the active head(s), determine the pine basal area in square feet per acre. A factor 10 prism or an angle gauge will be useful for this. Contact your county Extension agent or local forester for assistance. Also, note whether the stand is pulpwood (less than 9 inches diameter breast height (dbh)) or sawtimber (greater than 9 inches dbh). Using this information and Table 2, you can set control priorities for your SPB spots.

**Table 2. Guide to Southern Pine Beetle Spot Growth and Control Priorities
(May through October)**

Key to Spot Growth	Your Spot's Classification	Risk-rating Points
A. Fresh attacks	absent	0
	present	30
B. Number of freshly attacked trees and those with developing brood	1-10	0
	11-20	10
	21-50	20
	more than 50	40
C. Pine basal area (or stand density) at active head(s) (ft ² /acre)	less than 80 (low density)	0
	80-120 (medium density)	10
	more than 120 (high density)	20
D. Average size class of timber (in inches)	pulpwood (9 inches or less)	0
	sawtimber (more than 9 inches)	10
Add up the risk-rating points that apply to your spot.		
SCORE	CONTROL PRIORITY	
0-30	Low	
40-60	Medium	
70-100	High	

High priority spots will spread and should be controlled as soon as possible. Medium-priority spots, however, can be handled as time permits. Low-priority spots may need no control. Medium- and low-priority spots should be checked every 4-6 weeks until they are controlled or become inactive.

Direct Control of a SPB Spot

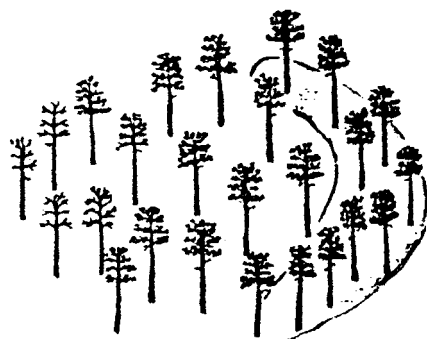


Figure 2

Direct control of an active SPB spot is accomplished by two methods. These are a cut-and-leave method and salvage removal. Deciding between these control methods is determined by the market value of the beetle killed wood, the availability of labor and equipment such as portable sawmills, and most important, access to the spot.

Salvage removal is the preferred method of controlling SPB, since it usually makes more money than it costs. Salvage, however, is not practical in situations where logging cost would be greater than the value of the wood. Salvage also allows a SPB spot to grow when it takes too long to arrange.

Cut-and-leave is the simplest and least expensive control method for spots with less than 50 infested trees and where salvage will be possible in the future. The primary advantage of cut-and-leave is that SPB control can be accomplished soon after a spot is discovered.

With both direct control methods, an adequate buffer of uninfested trees must be cut around the active head(s) of the SPB spot. Figure 2 shows the horseshoe-shaped buffer that should be marked and included in any SPB control treatment. A 40-100 foot buffer insures the removal of all infested trees and disrupts pheromone production, causing SPBs to scatter rather than concentrate.

For cut-and-leave, the freshly infested trees should be felled first, followed by cutting the buffer. All the trees should be felled towards the center of the infested spot. Crowns left on the trees will hasten drying of the inner bark. This drying disrupts the brood developing in that tree.

Trees that are dead and do not contain SPB should not be cut in a cut-and-leave operation until a salvage is possible. These trees are providing food and shelter for natural enemies of SPB and encourage their development. Woodpeckers, who feed on SPB, also use dead pines for nests.

When salvage operations can be arranged, trees in the buffer strip should be removed first. Loading decks should be as far as possible from green timber. Emerging beetles may attack adjacent trees, causing a breakout. All SPB spots should be checked a couple of weeks after treatment for breakouts or new infestations.

Preventing a SPB Attack

Good forest management is the only way to obtain resistance to a SPB attack. Maintaining vigorously growing trees is the best defense against SPB attack. Thinning over-crowded stands, regenerating slow-growing, over-mature or diseased trees and favoring resistant species when thinning or regenerating all promote individual tree and stand resistance to SPB. Minimizing soil compaction and tree injuries also helps to “beetle-proof” a forest.

The timber destroyed by SPB this year might be yours. Be ready to take action.

For more information, contact your county Extension office.

Sources:

Billings, Ronald F. and Herbert A. Pase III, 1979, Southern Pine Beetle Handbook, “A Field Guide for Ground Checking Southern Pine Beetle Spots,” USDA, Combined Forest Pest Research and Development Program, AG Handbook No. 558.

Tankersley, Larry A. 1985, “Southern Pine Beetle — 1985,” Forest Resources Note No. 53, July, 1985. University of Georgia Cooperative Extension Service.